

IN THE CLAIMS

1. (Currently Amended) A rotor structure for a permanent-magnet motor, comprising:

an annular laminated stack of electromagnetic steel sheets incorporating therein permanent magnets;

a pair of annular end plates between which the annular laminated stack is sandwiched;

a cylindrical core buck having its outer circumferential periphery carrying thereon the annular laminated stack and the annular end plates; and

a rotor shaft integrally connected to the cylindrical core buck to be rotatable therewith; wherein

each outer end surface of the annular laminated stack has a plurality of first fixing portions formed in one of substantially triangular and trapezoidal-shapes in an axial direction to the rotor shaft, and an inner surface of each of the annular end plates has a plurality of second fixing portions formed in one of substantially triangular and trapezoidal-shapes in the axial direction to the rotor shaft; ~~and~~

the first fixing portions of each outer end surface of the annular laminated stack are engaged with the first fixing portions of adjoining outer end surface of the annular laminated stack, and

~~wherein~~ the annular laminated stack and the annular end plates are fixedly coupled to one another by caulking at the plurality of first and second fixing portions ~~formed in one of substantially triangular and trapezoidal shapes.~~

2. (Original) The rotor structure according to claim 1, wherein the annular laminated stack and the annular end plates are held on the cylindrical core buck and fixed thereto by a C-ring fitted thereto.

3. (Original) The rotor structure according to claim 1, wherein the annular end plates and the annular laminated stack are fixed to the cylindrical core buck by caulking.

4. (Original) The rotor structure according to claim 1, wherein each of the annular end plates is made of non-magnetic material.

5. (Original) The rotor structure according to claim 1, wherein each of the annular end plates is made of stainless steel.

6. (Original) The rotor structure according to claim 1, wherein the first fixing portions of the annular laminated stack are located in a circumferential area distanced from an inner circumferential periphery of each electromagnetic steel sheet by from 7 to 30 % a radial length of each electromagnetic steel sheet relative to an out circumferential periphery thereof and at circumferentially, equally spaced positions.

7. (Currently Amended) The rotor structure according to claim 6, wherein each of the first fixing portions of the annular laminated stack is formed in a rectangular shape on each electromagnetic sheet plate which has a side of more than 1 mm and another side of more than 2 mm, and wherein each of the first fixing portions ~~formed in one of~~

~~substantially triangular and trapezoidal shapes~~ has a height in the axial direction to the rotor shaft, equal to one to two times the thickness of each electromagnetic steel plate.

8. (Currently Amended) The rotor structure according to claim 1, wherein each of the second fixing portions of the annular end plate has substantially the same ~~dimensional~~ size as that of each of the first fixing portion of the annular laminated stack.

9. (Original) The rotor structure according to claim 1, wherein each of the annular end plates has an excessive marginal portion for enabling a rotating balance of the rotor.

10. (Currently Amended) A rotor structure for a magnet motor, comprising:
an annular laminated stack of electromagnetic steel plates incorporating therein permanent magnets;

annular means holding the annular laminated stack at both sides thereof in a fixed place;

cylindrical means carrying thereon the annular laminated stack and the annular means; and

a rotor shaft integrally connected to the cylindrical means to be rotatable therewith; wherein each outer end surface of the annular laminated stack has a plurality of first fixing portions formed in one of substantially triangular and trapezoidal-shapes in an axial direction to the rotor shaft, and the annular means has a plurality of

second fixing portions formed in one of substantially triangular and trapezoidal-shapes;
and

the first fixing portions of each outer end surface of the annular laminated stack
are engaged with the first fixing portions of the adjoining outer end surface of the annular
laminated stack, and

~~wherein~~ the annular laminated stack and the annular means are fixedly coupled to
one another by caulking at the plurality of first and second fixing portions ~~formed in one~~
~~of substantially trapezoidal or triangular shapes.~~

REMARKS

In response to the Office Action dated April 29, 2003, claims 1, 7, 8 and 10 are amended. Claims 1-10 are now active in this application. No new matter has been added.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 7 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner contends that the Figures do not show a rectangular shape for the fixing portions.

From this rejection Applicants believe that the shapes of first and second fixing portions of the present invention is not fully understood by the Examiner. Consequently, to expedite prosecution, claims 1, 7, and 10 are amended to emphasize that the shapes of the first and second fixing portions of the Amendment dated February 21, 2003 is a shape in an axial direction to the rotor shaft. More specifically, the first and second fixing portions has one of substantially triangular and trapezoidal-shapes in an axial direction to the rotor shaft, and has a rectangular shape on each electromagnetic sheet plate.

Furthermore, amended independent claims 1 and 10 add new limitation of the first fixing portions; i.e., the first fixing portions of each outer end surface of the annular laminated stack are engaged with the first fixing portions of adjoining outer end surface of the annular laminated stack.

In addition, claim 8 is slightly changed.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 103

Claims 1-6 and 8-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Herron in view of Cuenot et al. and Saban et al.

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Herron in view of Cuenot et al. and Saban et al. as applied to claim 6, and further I view of Yamamoto.

Claims 1 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art (Figures 1 and 2) in view of Saban et al.

To expedite prosecution, claims 1, 7, 8, and 10 are amended in order to make clear distinctions between the present invention and the applied prior art references.

Amended independent claims 1 and 10 are believed patentable over the applied prior art references for the following reasons:

(1) Firstly, all of the applied prior art references do not disclose or suggest the features of amended independent claims 1 and 10. More specifically, although the Saban et al. allowably discloses several shapes (circular shape, square shape, rectangle shape, elongated shape, and bow-tie shape) of the projections 138, 238, 338, 438, and 538, as shown in Fig. 9a, 9b, and 9c, the shapes are a shape on each lamination sheet 28. Saban et al. disclose only rectangle shapes in "an axial direction" to a rotor shaft, the same as the Yamamoto patent.

(2) In Saban et al., projections 138 of each lamination sheet 28 is engaged with "receiving openings 148" of adjoining lamination 28. On the other hand, in the present invention, the first fixing portions of each outer end surface of the annular laminated

stack are engaged with the first fixing portions of adjoining outer end surface of the annular laminated stack.

(3) The trapezoidal- or triangular-shapes of the first and second fixing portions enable the annular laminated stack and annular end plates to couple more smoothly and easily than the shapes of fixing portions of the cited references. Thus, amended independent claims 1 and 10 are patentable over the applied prior art references and their allowance is respectfully solicited..

(4) The remaining claims 2-9 are allowable at least by virtue of their dependency from the amended independent claim 1. Further, under the above-described features of amended independent claim 1, the claims 2-9 play an important role in compensation of fixing (and caulking) strength. Especially, the numerical limitations of claims 6 and 7 depend on the concrete shape of the first and second fixing portions. Thus, the numerical limitations are not obvious and none of the applied prior art references disclose or teach these numerical limitations.

CONCLUSION

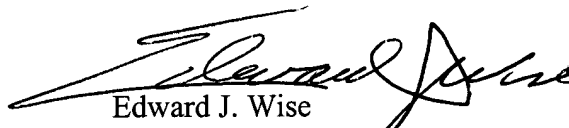
Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

09/963,552

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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